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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,632	04/08/2004	Robin Pierce Gardner	5051-631	8467

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EXAMINER	
BAKER, DAVID S	

ART UNIT	PAPER NUMBER
2884	

DATE MAILED: 12/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/820,632	GARDNER, ROBIN PIERCE	
	Examiner	Art Unit	
	David S. Baker	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) *8,12,13,22 and 23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,9-11,14-21,24 and 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *08/21/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 21 August 2006 has been accepted and entered.

Claim Objections

2. Claims 9-11 and 14 are objected to under 37 CFR 1.75 as being in improper form because they claim dependence to a canceled claim. For examination purposes, the examiner has ignored the 37 CFR 1.75 problems with the claims and has assumed that they are meant to each be dependent upon claim 1 in order to conduct a prior art examination.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 15-21 and 24 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claims 15-21 and 24, the claims are directed to a judicial exception; as such, pursuant to the Interim Guidelines on Patent Eligible Subject Matter (MPEP 2106), the claims must have either physical transformation and/or a useful, concrete and tangible result. The claims fail to include transformation from one physical state to another. Although, the claims appear useful and concrete, there does not appear to be a tangible result claimed. Merely summing the signals of two detection events would not appear to be sufficient to constitute a tangible result, since the outcome of the summing step has not been used in a disclosed practical application nor made available in such a manner that its

usefulness in a disclosed practical application can be realized. As such, the subject matter of the claims is not patent eligible.

Regarding claim 20, the claim is directed to a judicial exception; as such, pursuant to the Interim Guidelines on Patent Eligible Subject Matter (MPEP 2106), the claim must have either physical transformation and/or a useful, concrete and tangible result. The claim fails to include transformation from one physical state to another. Although, the claim appears useful and concrete, there does not appear to be a tangible result claimed. Merely determining a rate of coincidence between an event in one of the first and second gamma ray detectors and an annihilation photon in the other of the first and second gamma ray detectors would not appear to be sufficient to constitute a tangible result, since the outcome of the determining step has not been used in a disclosed practical application nor made available in such a manner that its usefulness in a disclosed practical application can be realized. As such, the subject matter of the claim is not patent eligible.

Regarding claim 21, the claim is directed to a judicial exception; as such, pursuant to the Interim Guidelines on Patent Eligible Subject Matter (MPEP 2106), the claim must have either physical transformation and/or a useful, concrete and tangible result. The claim fails to include transformation from one physical state to another. Although, the claim appears useful and concrete, there does not appear to be a tangible result claimed. Merely determining the rate of coincidence between an event and two annihilation photons would not appear to be sufficient to constitute a tangible result, since the outcome of the determining step has not been used in a disclosed practical application nor

made available in such a manner that its usefulness in a disclosed practical application can be realized. As such, the subject matter of the claim is not patent eligible.

Regarding claim 24, the claim is directed to a judicial exception; as such, pursuant to the Interim Guidelines on Patent Eligible Subject Matter (MPEP 2106), the claim must have either physical transformation and/or a useful, concrete and tangible result. The claim fails to include transformation from one physical state to another. Although, the claim appears useful and concrete, there does not appear to be a tangible result claimed. Merely determining a ratio of oxygen and carbon based on events in the first and second gamma ray detectors would not appear to be sufficient to constitute a tangible result, since the outcome of the determining step has not been used in a disclosed practical application nor made available in such a manner that its usefulness in a disclosed practical application can be realized. As such, the subject matter of the claim is not patent eligible.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 3-4, 6-7, 9-11, 15-16, 18-21, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meyerhof (US Patent #3,041,455 A) in view of Holenka (US Patent #5,023,449 A).

Regarding claim 1, Meyerhof discloses a gamma ray detector assembly for placement in a logging tool in a borehole, the detector assembly comprising: a first gamma ray detector (crystal 30, figure 1, figure 2) elongated along an axis and defining a void extending along the axis (column 2 lines 66-72, column 3 lines 1-6); and a second gamma ray detector (crystal 20, figure 1, figure 2) conforming to at least a portion of the void (column 2 lines 66-72, column 3 lines 1-6), wherein the first and second gamma ray detectors are configured to be positioned in the borehole (figure 1, column 1 lines 10-22); and a signal processor (preamplifiers 22 and 32, amplifiers 23 and 33, discriminator 34, gating circuit 35, pulse analyzer 36, recorder 37, and depth indicator 38, figure 1) configured to receive signals from the first and second gamma ray detectors (column 4 lines 14-40) and determine the rate of coincidence (column 4 lines 14-40). Meyerhof does not disclose expressly that the signal processor determines coincidence based on the sum of the first and second event such that the events sum to a predetermined energy between 1.5 MeV and 11 MeV. Holenka discloses a gamma ray detector for well bore operation that determines coincidence based on the sum of the first and second event such that the events sum to a predetermined energy that may fall between 1.5 MeV and 11 MeV (figure 6, column 6 lines 48-68, column 7 lines 1-6). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use a summation circuit for determining coincidence for energies between 1.5 MeV and 11 MeV. The motivation for doing so would have been that knowing the energy peaks for elements such as carbon and hydrogen fall within this range, it would be a useful range for detection of hydrocarbons of value such as oil.

Regarding claim 3, Meyerhof discloses that the first gamma ray detector and the second gamma ray detector are scintillation detectors (column 2 lines 35-37, column 6 lines 20-26).

Regarding claim 4, Meyerhof discloses that the first and second gamma ray detectors are cylindrical, the first gamma ray detector forms an outer cylinder and the second detector forms an inner cylinder (figure 2, column 2 lines 66-72, column 3 lines 1-6).

Regarding claim 6, Meyerhof discloses that a shielding material (bismuth shielding 16, boron shielding 48, figures 1 and 2) is on the lower end of the first gamma ray detector (column 3 lines 29-47 and 67-73) and a radioactive neutron source (neutron source 15, figure 1) on a side of the shielding material facing away from the first gamma ray detector (figure 1, column 3 lines 29-47 and 67-73), wherein the radioactive source is configured to irradiate material in the borehole (column 3 lines 29-47).

Regarding claim 7, Meyerhof discloses a first photomultiplier tube (photomultiplier tube 31, figure 1) in communication with the first gamma ray detector (crystal 30, figure 1, figure 2) and a second photomultiplier tube (photomultiplier tube 21, figure 1) in communication with the second gamma ray detector (crystal 20, figure 1, figure 2).

Regarding claim 9, Meyerhof discloses that the signal processor is configured to detect a first event in one of the first gamma ray detector and the second gamma ray detector and to determine if a second event is detected in coincidence with the first event in the other of the first and second gamma ray detectors (column 4 lines 14-40).

Regarding claim 10, Meyerhof discloses that the signal processor is configured to determine the rate of coincidence between an event in one of the first and second gamma ray detectors and an annihilation photon in the other of the first and second gamma ray detectors (figure 3, column 3 lines 74-75, column 4 lines 1-40).

Regarding claim 11, Meyerhof discloses that the signal processor is configured to determine the rate of coincidence between an event and two annihilation photons (figure 3, column 3 lines 74-75, column 4 lines 1-40).

Regarding claim 15, Meyerhof discloses a method of detecting gamma rays in a borehole, the method comprising: placing a first gamma ray detector (crystal 30, figure 1, figure 2) and second gamma ray detector (crystal 20, figure 1, figure 2) into the borehole (column 1 lines 10-22), wherein the first gamma ray detector is elongated along an axis and defines a void extending along an axis (column 2 lines 66-72, column 3 lines 1-6) and the second gamma ray detector conforms to at least a portion of the void (column 2 lines 66-72, column 3 lines 1-6); detecting a first event in one of the first gamma ray detector and the second gamma ray detector (column 4 lines 14-40); and determining whether a second event is detected in coincidence with the first event in the other of the first gamma ray detector and the second gamma ray detector (column 4 lines 14-40). Meyerhof does not disclose expressly that the signal processor determines coincidence based on the sum of the first and second event such that the events sum to a predetermined energy between 1.5 MeV and 11 MeV. Holenka discloses a gamma ray detector for well bore operation that determines coincidence based on the sum of the first and second event such that the events sum to a predetermined energy that may fall

between 1.5 MeV and 11 MeV (figure 6, column 6 lines 48-68, column 7 lines 1-6). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use a summation circuit for determining coincidence for energies between 1.5 MeV and 11 MeV. The motivation for doing so would have been that knowing the energy peaks for elements such as carbon and hydrogen fall within this range, it would be a useful range for detection of hydrocarbons of value such as oil.

Regarding claim 16, Meyerhof discloses that the first and second gamma ray detectors are cylindrical, the first gamma ray detector forms an outer cylinder and the second detector forms an inner cylinder (figure 2, column 2 lines 66-72, column 3 lines 1-6).

Regarding claim 18, Meyerhof discloses positioning shielding material (bismuth shielding 16, boron shielding 48, figures 1 and 2) on the lower end of the first gamma ray detector (column 3 lines 29-47 and 67-73) and positioning a radioactive source (neutron source 15, figure 1) on a side of the shielding material facing away from the first gamma ray detector (figure 1, column 3 lines 29-47 and 67-73), and irradiating material in the borehole with the radioactive source (column 3 lines 29-47).

Regarding claim 19, Meyerhof discloses providing a first photomultiplier tube (photomultiplier tube 31, figure 1) in communication with the first gamma ray detector (crystal 30, figure 1, figure 2, column 2 lines 35-65) and a second photomultiplier tube (photomultiplier tube 21, figure 1) in communication with the second gamma ray detector (crystal 20, figure 1, figure 2, column 2 lines 35-65).

Regarding claim 20, Meyerhof discloses determining whether a second event is detected in coincidence with the first event includes determining the rate of coincidence between an event in one of the first and second gamma ray detectors and an annihilation photon in the other of the first and second gamma ray detectors (figure 3, column 3 lines 74-75, column 4 lines 1-40).

Regarding claim 21, Meyerhof discloses determining whether a second event is detected in coincidence with the first event includes determining the rate of coincidence between an event and two annihilation photons (figure 3, column 3 lines 74-75, column 4 lines 1-40).

Regarding claim 25, Meyerhof discloses a method of detecting gamma rays in a borehole comprising: placing a first gamma ray detector (crystal 30, figure 1, figure 2) and second gamma ray detector (crystal 20, figure 1, figure 2) into the borehole (column 1 lines 10-22); detecting a first event in one of the first gamma ray detector and the second gamma ray detector (column 4 lines 14-40); and determining whether a second event is detected in coincidence with the first event in the other of the first gamma ray detector and the second gamma ray detector (column 4 lines 14-40). Meyerhof does not disclose expressly that the signal processor determines coincidence based on the sum of the first and second event such that the events sum to a predetermined energy between 1.5 MeV and 11 MeV. Holenka discloses a gamma ray detector for well bore operation that determines coincidence based on the sum of the first and second event such that the events sum to a predetermined energy that may fall between 1.5 MeV and 11 MeV (figure 6, column 6 lines 48-68, column 7 lines 1-6). At the time the invention was made,

it would have been obvious to a person of ordinary skill in the art to use a summation circuit for determining coincidence for energies between 1.5 MeV and 11 MeV. The motivation for doing so would have been that knowing the energy peaks for elements such as carbon and hydrogen fall within this range, it would be a useful range for detection of hydrocarbons of value such as oil.

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meyerhof (US Patent #3,041,455 A), Holenka (US Patent #5,023,449 A), and further in view of Spurney (US Patent #4,764,677 A).

Regarding claim 2, Meyerhof and Holenka disclose all the limitations of claim 1, but does not disclose expressly that the gamma ray detector assembly further comprises a substantially waterproof housing enclosing the first gamma ray detector and the second gamma ray detector. Spurney discloses a well logging crystal scintillation detector where the detectors are enclosed in a dry box to prevent exposure to moisture and the crystals are enclosed in hermetically sealed metal container or housing (housing 10, window assembly 13, peripheral welds 17 and 18, figure 1, column 1 lines 21-33). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to enclose the detectors and crystals of Meyerhof and Holenka within the hermetically sealed housing of Spurney. The motivation for doing so would be to protect the detectors from moisture that would be detrimental to their operation as describe by Spurney (column 1 lines 21-33).

8. Claims 5 and 17 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Meyerhof (US Patent 3,041,455 A) in view of Holenka (US Patent #5,023,449 A).

Regarding claim 5, Meyerhof discloses that the scintillation crystals may have various geometrical cross-section configurations including a cylinder, a square, a polygon, etc. (column 6 lines 8-13). Therefore, Meyerhof teaches a first gamma ray detector having a variable thickness around the perimeter of the second gamma ray detector. Alternatively, it would have been obvious to use a crystal of variable thickness to conform to the overall shape of the detector housing to increase the likelihood that the scintillator crystal is properly secured within the housing.

Regarding claim 17, Meyerhof discloses that the scintillation crystals may have various geometrical cross-section configurations including but a cylinder, a square, a polygon, etc. (column 6 lines 8-13). Therefore, Meyerhof teaches a first gamma ray detector having a variable thickness around the perimeter of the second gamma ray detector. Alternatively, it would have been obvious to use a crystal of variable thickness to conform to the overall shape of the detector housing to increase the likelihood that the scintillator crystal is properly secured within the housing.

9. Claims 14 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meyerhof (US Patent 3,041,455 A), Holenka (US Patent #5,023,449 A), and further in view of McKeon (US Patent #4,937,446 A).

Regarding claim 14, Meyerhof and Holenka disclose all the limitations of claim 1, but do not disclose expressly that the signal processor is further configured to determine a

ratio of oxygen and carbon based on the events in the first and second gamma ray detectors. McKeon discloses a signal processor (electronics 24, telemetry 28, surface instrumentation 30, figure 1) configured to determine a ratio of oxygen and carbon based on the events in gamma ray detectors (column 7 lines 10-68, column 8 lines 1-33). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to determine a ratio of carbon to oxygen. The motivation for doing so is given by McKeon when he states that the determination of the carbon to oxygen ratio is the major goal of well logging.

Regarding claim 24, Meyerhof and Holenka disclose all the limitations of claim 15, but do not disclose expressly determining the ratio of oxygen and carbon based on the events in the first and second gamma ray detectors. McKeon discloses determining a ratio of oxygen and carbon based on the events in gamma ray detectors (column 7 lines 10-68, column 8 lines 1-33). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to determine a ratio of carbon to oxygen. The motivation for doing so is given by McKeon when he states that the determination of the carbon to oxygen ratio is the major goal of well logging.

Response to Arguments

10. Applicant's arguments with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Sharma (US Patent #6,220,371 B1) – Sharma discloses a detection coincidence well logging detector for gamma rays

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Baker whose telephone number is (571) 272-6003. The examiner can normally be reached on MTWRF 9:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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